NASA Technology Helps American Horses Get a Jump on Their Competition

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While still ensuring America's Space Shuttles lift off and land safely, NASA technology also will be at work helping premiere jumping horses do the same.

Horses are to be fitted with newly developed magnetic hoof protector pads and will wear them while competing.

According to their designer, Linda Hamilton Greenlaw, the pads are now being marketed worldwide under the name "Power Pads." Greenlaw says Power Pads support and cushion the impact of walking, running and jumping on the horse's hooves and legs, serving as an injury prevention product, similar to sneakers for human beings. Magnets implanted in the pads increase blood circulation in the horse's hooves, reducing the chance for injury, yet do not overheat the area. If any injury does occur to the hoof, the magnetic pad enhances blood flow to the area, speeding the healing process and helping to prevent permanent damage, Greenlaw says.

The magnetic material in the pads also works with the naturally occurring electrical impulses of the horse's nerves to reduce or eliminate pain from injuries to the hooves. According to an article, "Magnetic Fields in Animal Health," by Dr. Roger L. DeHaan, D.V.M., published in the February–April 1992 issue of the Journal of the American Holistic Veterinary Medical Association: "Magnets have been used successfully in medical therapy for humans and animals for hundreds of years, particularly for the treatment of osteoarthritus."

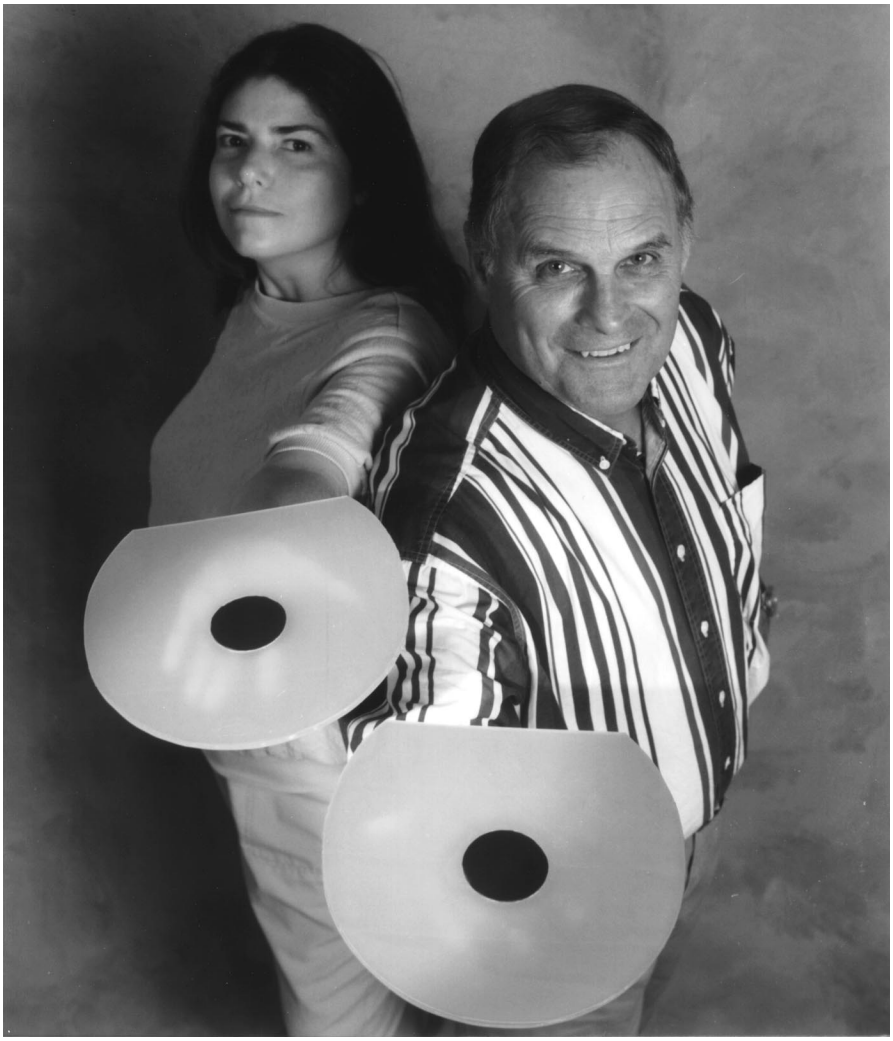

FIGURE 194.—A REALLY BIG SHOE. NASA materials engineer Deborah Dianne Schmidt and materials technician Anthony Schaffer show the prototypes for "Power Pads." These are hoof cushioning devices with magnet implanted in them for use on horses. Invented by New Englander Linda Hamilton Greenlaw, the pads' material was tested for fatigue and durability at MSFC.

According to Dr. DeHann's article, experiments at Loma Linda University in California, the Massachusetts Institute of Technology, and several universities in Europe have shown that magnetic devices improve blood flow to damaged tissues, speeding the healing process. Magnetism, the doctor writes, helps to order and align tissue salts in damaged cells. Electromagnetic stimulation gets the damaged tissues' fluids flowing again, helping to speed the elimination of waste products, reduce swelling, and restore normal function.

Magnetic material cannot be inserted directly into the hoof wall, as this can be

toxic; thus the pads are the best way of providing the benefits of magnets without the hazards. The pads "fill the need to use magnets in the hoof area without heat buildup or toxicity," Greenlaw said. "Through field testing, we've discovered that the magnetic pads will cause the horse's foot to grow faster and become more resinous, thus correcting the medical problem of 'brittle hooves,' caused by riding a horse on hard ground."

The cushioning material and the magnetic material in the prototype pads were fabricated and stress analyzed at MSFC, by materials engineer Deborah Dianne Schmidt and materials technician Anthony J. Schaffer.

According to Greenlaw, "I became aware of the technology development assistance available to U.S. firms via the Marshall Center through an article which appeared in the Kiplinger Washington Letter. Calling the 1–800–USA–NASA telephone number listed in the news article, I reached the Marshall Center's Technology Transfer Office. Staff there helped me submit a simple, one-page request for assistance in developing and marketing my idea."

The request was forwarded by the Technology Transfer Office staff to Schmidt at the center's Materials and Processes Laboratory for study and evaluation. The lab has an expertise in material stress analysis resulting from decades of such work related to the nation's space program.

"I conducted a fatigue stress analysis of the pads' magnetic inserts and sought to determine the best configuration for them," Schmidt said. "The analysis led to the optimal configuration for durability of the entire pad design. Also, I was able to recommend a simple method to place the magnetic inserts in the hoof pads so as to prevent material failures caused by stress. The hoof pad material is subjected to a good deal of stress as the horse walks, runs and jumps," she said. "The basic design uses a piece of magnetic material held in a cutout area inside each pad." Schaffer cut the pads and magnetic inserts with "surgical precision," Schmidt added.

The magnetic pads are placed on the horse's hooves, then the animal's metal horseshoes are fitted onto the pads. Conventional horseshoe nails hold the pads and horseshoes onto the hoof. They also may be attached with "Easy Glu" for horseshoes. The pads are durable enough to be used for more than one shoeing and should last 6 months to a year.

"The pads—for a horse—are the equivalent of a human being taking off leather street shoes and putting on the proper track shoes for an athletic event. By cushioning the horse's feet from injury, the pads are preventative as well as therapeutic," Greenlaw said. "The pads can be used by horses in any type of situation that puts stress on the animal's hooves and legs, including racing, rodeos, walking, show jumping, mounted police and military operations, and polo, in addition to simple recreational riding. Persons interested in more information about Power Pads should contact: Equine Enhancement Products, Inc., 37A Everett St., Woburn, MA 01801

Greenlaw, a former champion equestrian in the New England area, was left partially disabled following an automobile accident in 1991. Her love of horses led her to develop this product for the animals.

"Since my injury, I've prayed God would let me return to working with horses. I think this is that way," she said.

Sponsor: Office of Commercial Development and Technology Transfer

Biographical Sketch: Bob Lessels is the technical writer/editor (physical sciences) for the Technology Transfer Office at MSFC. A graduate of the University of Nebraska, he has been a professional journalist for the past 30 years. He joined NASA in 1986. ■